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The opinion in support of the decision being entered today was not written for publication in a law journal and is not binding precedent of the Board.

Paper No. 26

 UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte RICH FOGAL and MICHAEL B. BALL

Appeal No. 2003-2104
Application No. 09/422,887

ON BRIEF

Before KIMLIN, TIMM and JEFFREY T. SMITH, Administrative Patent Judges.

KIMLIN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 7-17, all the claims remaining in the present application. Claims 7 and 9 are illustrative:

7. A method of stacking a plurality of die, comprising

mounting an upper die on a lower die; and

defining a minimum angular offset with said mounting, wherein said minimum angular offset allows access to a bonding site on said lower die.

9. A method of manufacturing a multichip module including dies, comprising:

stacking all of said dies in a manner such that corresponding portions of any two of said dies define respective axes, and wherein said axes define an offset angle;

bonding wire to said dies; and

ensuring that said step of stacking all of said dies occurs with no intervening bonding step.

In the rejection of the appealed claims, the examiner relies upon the following reference:

de Givry (European Patent Application) 0,489,643 June 10, 1992

Appellants' claimed invention is directed to a method of stacking a plurality of die of a semiconductor device. The method entails defining a minimum angular offset for an upper die mounted on a lower die which allows access to a bonding site on the lower die. According to appellants, "[a] minimum angle is especially preferable if it is desired to stack the maximum number of dies while still ensuring clearance for the wire bonds leading to each die" (page 2 of principal brief, first paragraph).

Appealed claims 7-17 stand rejected under 35 U.S.C. § 102(b) as being anticipated by de Givry.

In accordance with the arguments set forth in appellants' brief, the following groups of claims stand or fall together: (I) claims 7 and 8; (II) claims 9-11; (III) claim 12; (IV) claims 13-16; and (V) claim 17.

We have thoroughly reviewed each of appellants' arguments for patentability. However, we are in complete agreement with the examiner that the claimed subject matter is described by de Givry within the meaning of 35 U.S.C. § 102. Accordingly, we will sustain the examiner's rejection for essentially those reasons expressed in the Answer.

de Givry, like appellants, discloses a method of stacking a plurality of die wherein an upper die is mounted on a lower die at an angular offset (see Figure 3 of de Givry). A principal argument advanced by appellants is that the claimed term "'minimum' connotes an absolute smallest value" that allows for access to a bonding site on the lower die.[1] According to appellants, de Givry discloses the maximum, not minimum, angles at which the upper and lower die are offset in order to ensure adequate space for accommodating an auxiliary component on the lower die. However, we concur with the examiner that appellants' argument is not commensurate in scope with the breadth of the

[1] Page 5 of Reply Brief, third paragraph.

claims on appeal. The claim 7 language "defining a minimum angular offset" does not require any particular angle, let alone an angle that only barely allows for access to a bonding site. Rather, the claim language encompasses an angle that allows for such access as well as for the placement of an auxiliary component in keeping with the disclosure of de Givry. Significantly, the appealed claims do not recite that the minimum angle defined is not great enough for the placement of auxiliary components.

Appealed claim 9 does not define such a minimum angular offset but calls for stacking all the dies of a multichip module with no intervening bonding step, which appellants and the examiner interpret as stacking all the dies before any bonding of wire to the dies. Here, we also agree with the examiner that Figure 3 of de Givry is described in the reference disclosure as being formed by first stacking the die and then "cabling" or bonding wire to the dies. It is appellants' position that reading de Givry in context, as a whole, "suggests that attaching a set of four chips and then cabling will be followed by de Givry stacking an additional set thereon and performing additional

cabling."[2] Hence, appellants maintain that such a stacking of an additional set of die would not result in de Givry stacking all the die before bonding wire to the die. It is our view, however, that although one of ordinary skill in the art may interpret the embodiment of de Givry's Figure 3 as allowing for the stacking of additional die after the first set of four is bonded with wire, one of ordinary skill in the art would also understand that an additional stacking of die is not necessary, i.e., a semiconductor device comprising a multichip module comprising only a set of four chips depicted in Figure 3 is also described by de Givry. We agree with the examiner's reasoning that "[s]ince de Givry never teaches a stack that comprises more than four chips, it can also be said that the de Givry reference suggests that no additional chip will be stacked on the set of four chips shown in Fig. 3."[3] In addition, we find that the term "comprising" of claim 9 opens the claim to additional stacking of die after all the die of one module are bonded.

As for separately argued claim 12, we find no substantive distinction between the claimed steps of "marginally clearing a line of sight" and "clearing a line of sight" and the angular

[2] Sentence bridging pages 8 and 9 of principal brief.

[3] Page 9 of Answer, second paragraph.

rotation of the reference die which also clears a line of sight to underlying die.

The arguments presented by appellants for claims 13-16 and 17 are essentially the same as those discussed above. Also, we agree with the examiner that one of ordinary skill in the art would interpret Figure 3 of de Givry, which depicts no auxiliary components, as possessing a minimum bond pad clearance. Also, appellants have not established that the relative terminology "minimum bond pad clearance" within the scope of claim 13 does not allow for the accommodation of auxiliary components of the same minimum dimension. Furthermore, appealed claim 13 does not preclude the presence of auxiliary components and embraces within its scope a minimum bond pad clearance that takes into account the dimensions of the auxiliary components. Significantly, claim 13 fails to specify any particular dimension for the clearance.

Concerning claim 17, appellants have not explained how the orientation of de Givry's Figure 3 embodiment does not define less than the maximum underlying bond pad clearance. We find that the die of reference Figure 3 could be reoriented to provide greater clearance in some areas. Again, the relative terminology

used by appellants fails to provide a substantive distinction from the multidie devices fairly described by de Givry.

In conclusion, based on the foregoing, the examiner's decision rejecting the appealed claims is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

EDWARD C. KIMLIN)
Administrative Patent Judge)
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CATHERINE TIMM) BOARD OF PATENT
Administrative Patent Judge) APPEALS AND
) INTERFERENCES
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JEFFREY T. SMITH)
Administrative Patent Judge)

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Charles Brantley
Micron Technology Inc.
8000 S. Federal Way
Mail Stop 525
Boise, ID 83716